KICKAPOO ENVIRONMENTAL OFFICE

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THE GREEN CLAN

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PHYTOREMEDIATION FOR BROWNFIELDS

(EPA 542-R-01-006, JULY 2001 BROWNFIELDS TECHNOLOGY PRIMER: SELECTING AND USING PHYTOREMEDIATION FOR SITE CLEANUP)

Phytoremediation is the direct use of living green plants for in situ (in-place or on-site) risk reduction for contaminated soil, sludge, sediments, and groundwater, through removal, degradation, or containment of the contaminant. Phytoremediation is also called as green remediation and botanoremediation.

Phytoremediation warrants consideration for cleaning up brownfields sites at which there are relatively low concentrations of contaminants (that is, organics, nutrients, or metals) over a large cleanup area and at shallow depths. Another potential application for phytoremediation is at sites that currently are "mothballed" and may be redeveloped in the future. Phytoremediation can be a cost effective alternative approach for reducing the leaching of contaminants through soil or groundwater, reducing the run-off of contaminated storm water, beginning an initial level of cleanup, and improving the aesthetic condition of a site.

Phytoremediation warrants consideration for use in conjunction with other technologies when the redevelopment and land use plans for the site include the use of vegetation. There is potential to use phytoremediation beneficially under a wide variety of site conditions. Types of sites at which phytoremediation has been applied or evaluated include: pipelines; industrial and municipal landfills; agricultural fields; wood treating sites; military bases; fuel storage tank farms; gas stations; army ammunition plants; sewage treatment plants; and mining sites. Phytoremediation is being tested and evaluated for its effectiveness in containing and treating a wide array of contaminants found at brownfields sites. While much more testing is needed, current results indicate that plants have the potential to enhance remediation of the following types of contaminants:

- Petroleum hydrocarbons
- Benzene, toluene, ethylbenzene, and xylene (BTEX)
- Polycyclic aromatic hydrocarbons (PAH)
- Polychlorinated biphenyls (PCB)
- Trichloroethene (TCE) and other chlorinated solvents
- Ammunition wastes and explosives
- Heavy metals
- Pesticide waste
- Radionuclides
- Nutrient wastes (such as phosphates and nitrates)

One of the more optimal applications of phytoremediation is as a containment technology. Since many brownfields sites are characterized by wide-spread contamination at low concentrations that are close to target cleanup levels, phytoremediation is a good containment alternative if geology and rainfall amounts are favorable.

Successful Reduction of Lead Contamination

Phyto-extraction was demonstrated at a site in Trenton, New Jersey that had been used for the manufacture of lead acid batteries. Phyto-extraction using Indian mustard (Brassica juncea) and ethylenediaminetetraacetic acid (EDTA) soil amendment reduced the average surface lead concentration by 13 percent in one growing season. The target soil concentration of 400 milligrams per kilogram (mg/kg) was achieved in approximately 72 percent of a 4,500 square-foot area. Some of the reduction may be attributed to dilution as a result of tilling and spreading contaminants deeper into the soil column.

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WORKING TOGETHER FOR A BETTER COMMUNITY

Recycling Tips

To help us in our recycling efforts, please try and follow the tips we have provided below:

- We accept only corrugated cardboard for recycling. No cereal or beer boxes please.
- We accept only #1 or #2 plastics, so please remove all plastic lids on bottles.
- Do not put bags of mixed recycling in the bin. Most recycling materials cannot be mixed, and they have to be treated as trash if they are mixed.
- Styrofoam is not recycled. Treat it as trash. None of the recycling centers that we know of handle Styrofoam, so please throw it away.

ANEW PROGRAM FOR THE KICKAPOO ENVIRONMENTAL OFFICE

Dear Readers,

As of the 1st of June, the Kickapoo Environmental Office has started a Brownfield program. So just what exactly is a Brownfield and this program about? The official definition of a Brownfield by the friendly folks at EPA is "a property, the expansion, redevelopment, or reuse of which may be complicated by the presence of potential presence of a hazardous substance, pollutant, or contaminant."

Basically, what the program is looking for are old dumpsites, sites that maybe actually have some kind of contamination, or for people believe that it is contaminated. Some examples might be: an abandoned house, abandoned vehicles, hydrocarbon spillages, solvents, pesticides, the presence of lead, and asbestos. Based on this, nobody wants to do anything with it and it just becomes an eyesore. Our goal is to get those sites cleaned up, so someone could do something with it.

The hardest part of this is going to be actually locating all the dumpsites. While we do have a few mapped, many more are hidden away from roads. If you know of a dump site you think may have flown under our radar, or have a potentially polluted site you would like dealt with, contact the Brownfield Coordinator by phone, or stop by our office.

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